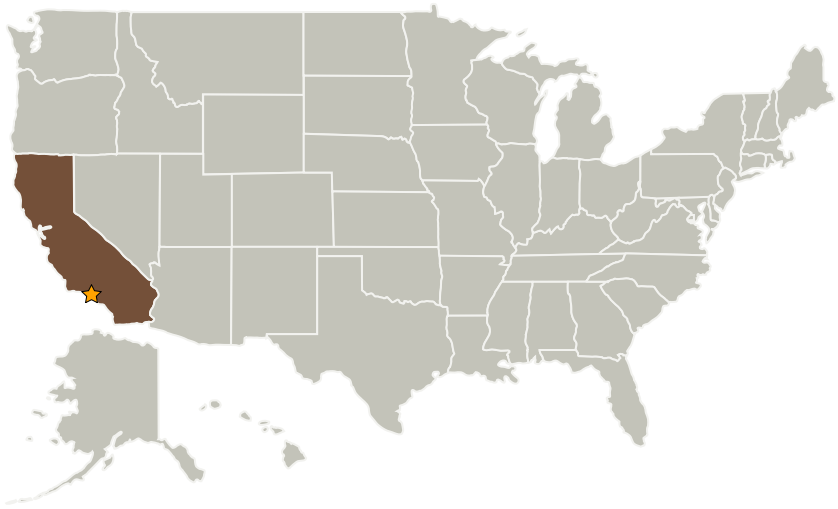
Elemental and Chemical State Analysis, XPS, for In-Situ Materials Analysis on Mars, Phase I

Completed Technology Project (2007 - 2007)

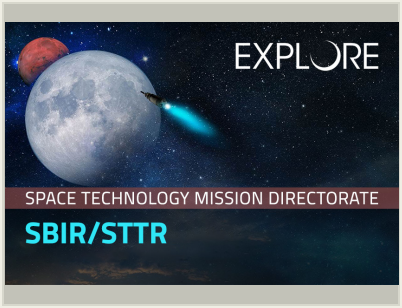
Project Introduction

This innovation is the design of a monochromatic x-ray source to be used in a mission compatible XPS spectrometer. Existing x-ray sources for XPS are large, require high power and a will have difficulty meeting the vibration specifications for a mission type instrument. The small x-ray sources developed for medical applications are exciting but are designed for high energy x-rays and require refractory anodes. This program will develop a new design suitable for mission applications. It will focus on small sources similar to the medical devices that will use low power. The monochromator will be designed for low mass and use a feedback based stabilization to keep it aligned independent of temperature and vibrations associated with missions launch. The feedback system will use x-ray detectors in a plane near the sample to since the x-ray beam direction and an interment angular vibration to make sure the monochromator is on the optimum angle for diffraction. After a suitable design is implemented with thermal electron sources, a nanotube excitation sources will be considered.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Apparati, Inc.	Supporting Organization	Industry	Hollister, California



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes